SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of ECE
B. Tech. (ECE 5th SEM) Minor Examination-I (ODD) 2019-20
(SEPT-OCT 2019)

Entry No: 17BECU3??
Date:

Total Number of Pages: [1]
Total Number of Questions: [6]

Course Title: Signal Processing & Linear Systems
Course Code: ECL 3180

Time Allowed: 1.5 Hours
Max Marks: [30]

Instructions / NOTE :
i. Attempt All Questions.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume any missing data to suit the case / derivation / answer.

Q1. Which of the following signals is/are periodic. If periodic find the period also
a) $s(t)= \cos 2t+\cos 3t+\cos 5t$
b) $s(t) = \exp(j8\pi t)$
c) $s(t)= \exp(-7t)\sin 10\pi t$
d) $s(t)= \cos 2t \cos 4t$

(2x4=8marks)

Q2. Find the power of the following signal
$S(t)= 8 \cos (20\pi t-\pi/2)+4 \sin(15\pi t)$

(3 marks)

Q3. If a signal f(t) has energy E, find the energy of the signal f(2t).

(3 marks)

Q4. Differentiate between:
a) Stable and Unstable Systems
b) Causal and Non Causal Systems
c) Linear and Non Linear Systems

(2x3=6 marks)

Q5. State and prove differentiation property of Z transform.

(5 marks)

Q6. Find Z-transform of following discrete time signal

$$x(n) = na^n u(n)$$

(5 marks)

Course Outcomes:
1. Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them
2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain.
3. Observe the effect of various properties and operations of signals and systems.
4. Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behaviour of electronic systems.

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of ECE
B. Tech. (ECE 5th SEM) Major Examination (ODD) 2019-20
(DEC 2019)

Entry No: 17BEC033
Date:

Total Number of Pages: [1]
Total Number of Questions: [5]

Course Title: Signal Processing & Linear Systems
Course Code: ECL 3180

Time Allowed: 3 Hours
Max Marks: [50]

Instructions / NOTE
i. Attempt All Questions.
ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iii. Assume any missing data to suit the case / derivation / answer.

Q1. Test the following systems for linearity
a) $y(n) = nx(n)$ b) $y(n) = x(n^2)$ c) $y(n) = x^2(n)$ d) $y(n) = Bx(n) + C$
(2.5x4=10marks)[CO:1]

Q2. a) Determine the Z transform and draw ROC of the following signal
$x(n) = (2)^{n+2}u(n-1)$ Is the signal causal?
(6 marks) [CO:2]

b) With the help of suitable example, explain Power Series Method of Inverse Z-transform.
(4 marks) [CO:2]

Q3. Differentiate between following terms:
a) Differential and Difference Equation
b) Static and Dynamic System
c) LTI and LSI system
d) Fourier Series and Fourier Transform
e) PDF and CDF of Random Variable
(2x5=10 marks) [CO:1,2,4]

Q4. Derive the equation of transfer function of FIR filter. Realize the transfer function by Direct Form by indicating all steps.
(10 marks) [CO:3]

Q5. If $f(0^-) = -3$ *and* $15u(t) - 4\delta(t) = 8f(t) + 6f'(t)$
Find f(t) with the help of Laplace technique.
(10 marks) [CO:2]

Course Outcomes:
1. Understand about various types of signals and systems, classify them, analyze them, and perform various operations on them
2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain.
3. Understand the realization of discrete time systems.
4. Understand the basics of probability and random variables.